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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/741,538	12/19/2003	David A. Petersen	2003P14535US	4649

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Siemens Corporation
Intellectual Property Department
170 Wood Avenue South
Iselin, NJ 08830

EXAMINER

CHENG, JACQUELINE

ART UNIT	PAPER NUMBER
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3768

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/741,538	Applicant(s) PETERSEN ET AL.	
	Examiner JACQUELINE CHENG	Art Unit 3768	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 March 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7,9-12 and 14-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6,9-12,14-17 and 19-24 is/are rejected.
- 7) ☒ Claim(s) 7 and 18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2/24/09, 4/29/09</u> | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. **Claims 1, 2, 16, 20, and 21** are rejected under 35 U.S.C. 102(a) as being anticipated by Hunt (US 2003/0139664 A1).
4. Hunt discloses an ultrasound system which partially beamforms (fig. 5 element 34) a plurality M elements from a transducer array (fig. 5 element 18) to a plurality N elements. The N elements are the processed to a different form appropriate for the ultrasound system such as an A/D converter (fig. 5 element 36). These processing are done within a transducer assembly which can be releasably connectable to the ultrasound circuitry/system (paragraph 0030)
5. **Claim 1, 2, 4, 6, 9, 10, 12, 14-17, and 19-24** are rejected under 35 U.S.C. 102(a) as being anticipated by Gilbert (US 6,530,887 B1).

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6. Gilbert discloses a transducer assembly (fig. 3a element 32) comprising a cable (fig. 3a elements 122a, 124a, 122b, 124b) connected with an ultrasound transducer array of M elements (fig. 3a element 10) and a connector housing (fig. 3a element 30) which partially encloses a detachable connector (a Fire Wire which has a plurality of N outputs, fig. 3a element 220, col. 25 line 7-8) and a signal processing device (fig. 3a elements 100a, 100b). The signal processing device partially beamforming (fig. 3a element 116a, 116b) the signals using mixes (multiplier 627, fig. 4a), analog to digital converters (converting signals to a form appropriate for the ultrasound system, fig. 3a, element 650), and demultiplexors (col. 5 line 35-36).

7. **Claims 16, 20, and 21** are rejected under 35 U.S.C. 102(e) as being anticipated by Peterson (US 2004/0181154). Peterson discloses a method for adapting signals comprising partially beamforming M signals to N signals and converting the partially beamformed signals by using a digital to analog converter all in the transducer assembly (paragraph 0014, 0015)

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

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evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. **Claims 1, 2, 4, and 6** are rejected under 35 U.S.C. 103(a) as being unpatentable over Leavitt (US 6,491,634 B1) in view of Petrofsky (US 5,573,001) and Gilbert.

11. Leavitt discloses a portable ultrasound system comprising a front end transducer assembly (fig. 1 element 106) connected to an ultrasound system (fig. 1 element 102) with an interface cable (fig. 1 element 104). Various circuitry is housed in the transducer assembly including a partial beamformer (fig. 2 element 218), which processes signals from a plurality of elements M to a lesser plurality of elements N, and an analog to digital converter (fig. 2 element 214). Although Leavitt discloses the analog to digital converter placed before the beamformer it would have been obvious to one having ordinary skill in the art at the time the invention was made to place the converter after the beamformer, since it has been held that a mere reversal of the essential working parts of a device involves only routine skill in the art (In re Einstein, 9 USPQ 167) as well as Leavitt discloses that the beamformer can be implemented as disclosed in US 6,013,032 which places the partial beamformer before the converter (col. 4 line 46-49). Furthermore it would have been obvious to place the converter after the beamformer for the purpose of reducing the number of converters needed as taught by Petrofsky (col. 7 line 1-3).

12. Leavitt discloses connecting the front end transducer assembly to the ultrasound system via an interface cable but fails to explicitly disclose what type of interface cable is used. It would be obvious to one skilled in the art to use any well known interface cable such as taught by

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Gilbert. Gilbert teaches a hand-held ultrasound probe system which uses an interface with the ultrasound system via standard high-speed communications protocol such as Fire Wire or USB protocol which are well known in the art to be detachable connections (col. 3 line 55-61).

13. **Claim 3** is rejected under 35 U.S.C. 103(a) as being unpatentable over Hunt further in view of Chiang (US 5,839,442). Hunt does not disclose disclosing applying different phase shifts in the partial beamformer. Hunt does disclose using a delay circuit in the partial beamformer and that any other now known or later developed beamforming circuitry can be used (paragraph 0032) so it would therefore be obvious to one skilled in the art at the time of the invention to use any well known delay circuit for a partial beamformer for the purpose of getting the correct timing depending upon the type of ultrasound being used. Applying phase shifts to signals and combining the signals is very well known in the art such as disclosed by Chiang (col. 3 line 5-7, fig. 2c).

14. **Claim 3** is rejected under 35 U.S.C. 103(a) as being unpatentable over Leavitt in view of Petrofsky in view of Gilbert further in view of Chiang (US 5,839,442). Leavitt does not disclose disclosing applying different phase shifts in the partial beamformer. Leavitt does disclose using a delay circuit in the partial beamformer. It would therefore be obvious to one skilled in the art at the time of the invention to use any well known delay circuit for a partial beamformer for the purpose of getting the correct timing depending upon the type of ultrasound being used. Applying phase shifts to signals and combining the signals is very well known in the art such as disclosed by Chiang (col. 3 line 5-7, fig. 2c).

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15. **Claims 4, 6, 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hunt in view of Gilbert. Hunt does not disclose using demultiplexors or mixers however Hunt discloses that any other now known or later developed beamforming circuitry can be used (paragraph 0032) so it would therefore be obvious to one skilled in the art at the time of the invention to use mixers and demultiplexors as these are well known to be used in beamforming as disclosed by Gilbert. Gilbert discloses beamforming using mixers (multiplier 627, fig. 4a) and demultiplexors (col. 5 line 35-36).

16. **Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over Hunt further in view of Peterson. Hunt does not disclose converting digital signals to analog signals however it would be obvious in the art to either convert analog to digital signal or digital to analog signals as appropriate for the types of circuitry in the probe and the types of data exchanged with the base ultrasound unit such as disclosed by Peterson (paragraph 0015).

17. **Claim 5 and 11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Gilbert further in view of Peterson. Gilbert does not disclose converting digital signals to analog signals however it would be obvious in the art to either convert analog to digital signal or digital to analog signals as appropriate for the types of circuitry in the probe and the types of data exchanged with the base ultrasound unit such as disclosed by Peterson (paragraph 0015).

18. **Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over Leavitt in view of Petrofsky in view of Gilbert further in view of Peterson. Leavitt does not disclose converting digital signals to analog signals however it would be obvious in the art to either convert analog to digital signal or digital to analog signals as appropriate for the types of circuitry in the probe and

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the types of data exchanged with the base ultrasound unit such as disclosed by Peterson (paragraph 0015).

Allowable Subject Matter

19. **Claims 7 and 18** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 6,375,617 B1 to Fraiser.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JACQUELINE CHENG whose telephone number is (571)272-5596. The examiner can normally be reached on M-F 10:00-6:30.

22. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on 571-272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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23. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JC

/Long V Le/

Supervisory Patent Examiner, Art Unit 3768